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**TRANSMITTAL  
FORM**

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Total Number of Pages in This Submission 20

Application Number	10/805,846
Filing Date	March 22, 2004
First Named Inventor	Ming LI
Art Unit	1725
Examiner Name	Heinrich, Samuel M.
Attorney Docket No.	MATG-406US

**ENCLOSURES (Check all that apply)**

- |  |  |   |
|--|--|---|
| <input type="checkbox"/> Fee Transmittal Form<br><input type="checkbox"/> Fee Attached<br><br><input type="checkbox"/> Amendment/Reply<br><input type="checkbox"/> After Final<br><input type="checkbox"/> Affidavits/Declaration(s)<br><br><input type="checkbox"/> Extension of Time Request<br><br><input type="checkbox"/> Express Abandonment Request<br><br><input type="checkbox"/> Information Disclosure Statement<br><br><input type="checkbox"/> Certified Copy of Priority Document(s)<br><br><input type="checkbox"/> Response to Missing Parts/<br>Incomplete Application<br><input type="checkbox"/> Response to Missing Parts<br>under 37 CFR 1.52 or 1.53 | <input type="checkbox"/> Drawing(s)<br><input type="checkbox"/> Licensing-related Papers<br><input type="checkbox"/> Petition<br><input type="checkbox"/> Petition to Convert to a<br>Provisional Application<br><input type="checkbox"/> Power of Attorney, Revocation,<br>Change of Correspondence<br>Address<br><input type="checkbox"/> Terminal Disclaimer<br><input type="checkbox"/> Request for Refund<br><input type="checkbox"/> CD, Number of CD(s) _____<br><input type="checkbox"/> Landscape Table on CD | <input type="checkbox"/> After Allowance Communication<br>to TC<br><input type="checkbox"/> Appeal Communication to Board<br>of Appeals and Interferences<br><input checked="" type="checkbox"/> Appeal Communication to TC<br>(Appeal Notice, Brief, Reply<br>Brief)<br><input type="checkbox"/> Proprietary Information<br><input type="checkbox"/> Status Letter<br><input checked="" type="checkbox"/> Other Enclosure(s) (please<br>identify below): PTO-2038 AND<br>RETURN RECEIPT<br>POSTCARD. |
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**Remarks:****SIGNATURE OF APPLICANT, ATTORNEY OR AGENT**

Firm Name	RatnerPrestia
Signature	
Printed Name	Lowell L. Carson
Date	February 1, 2007

Registration No. 48,548

**CERTIFICATE OF TRANSMISSION / MAILING**

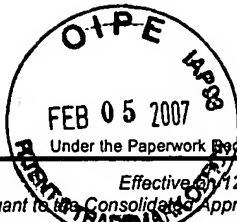
I hereby certify that this correspondence is being facsimile transmitted to the USPTO 571-273-8300 Mail Stop Appeal Brief-Patents: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date shown below:

Signature	
Typed or Printed Name	Kathleen Spina

Date February 1, 2007

This collection of information is required by 37 CFR 1.5. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Office, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, ALEXANDRIA, VA 22313-1450.

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<b>Effective 12/08/04.</b> Fees pursuant to the Consolidated Appropriations Act, 2005 (H.R. 4818). <b>FEE TRANSMITTAL</b> <b>For FY 2006</b>	<b>Complete if Known</b>	
	Application Number	10/805,846
	Filing Date	March 22, 2004
	First Named Inventor	Ming LI
	Examiner Name	1725
<input type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27	Art Unit	Heinrich, Samuel M.
<b>TOTAL AMOUNT OF PAYMENT</b>	<b>(\$)</b>	<b>500.00</b>
	Attorney Docket No.	MATG-406US

**METHOD OF PAYMENT** (check all that apply)

☐ Check ☒ Credit Card ☐ Money Order ☐ None ☐ Other (please identify): \_\_\_\_\_

☒ Deposit Account Deposit Account Number: 18-0350 Deposit Account Name: RatnerPrestia

For the above-identified deposit account, the Director is hereby authorized to: (check all that apply)

☐ Charge fee(s) indicated below ☐ Charge fee(s) indicated below, except for the filing fee  
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**FEE CALCULATION**

**1. BASIC FILING, SEARCH, AND EXAMINATION FEES**

Application Type	FILING FEES		SEARCH FEES		EXAMINATION FEES		Fees Paid (\$)
	Small Entity	Fee (\$)	Small Entity	Fee (\$)	Small Entity	Fee (\$)	
Utility	300	150	500	250	200	100	_____
Design	200	100	100	50	130	65	_____
Plant	200	100	300	150	160	80	_____
Reissue	300	150	500	250	600	300	_____
Provisional	200	100	0	0	0	0	_____

**2. EXCESS CLAIM FEES**

Fee Description	Small Entity	
	Fee (\$)	Fee (\$)
Each claim over 20 (including Reissues)	50	25
Each independent claim over 3 (including Reissues)	200	100
Multiple dependent claims	360	180

**Total Claims** - 20 or HP = \_\_\_\_\_ x \_\_\_\_\_ = \_\_\_\_\_  
**Extra Claims** Fee (\$)  
**Fee Paid (\$)**

HP = highest number of total claims paid for, if greater than 20

**Indep. Claims** - 3 or HP = \_\_\_\_\_ x \_\_\_\_\_ = \_\_\_\_\_  
**Extra Claims** Fee (\$)  
**Fee Paid (\$)**

HP = highest number of independent claims paid for, if greater than 3

**3. APPLICATION SIZE FEE**

If the specification and drawings exceed 100 sheets of paper (excluding electronically filed sequence or computer listings under 37 CFR 1.52(e)), the application size fee due is \$250 (\$125 for small entity) for each 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

**Total Sheets** - 100 = \_\_\_\_\_ **Extra Sheets** / 50 = \_\_\_\_\_ **Number of each additional 50 or fraction thereof** x \_\_\_\_\_ = \_\_\_\_\_  
**Fee (\$)** **Fee Paid (\$)**

**4. OTHER FEE(S)**

Non-English Specification, \$130 fee (no small entity discount)

Other (e.g., late filing surcharge): APPEAL BRIEF

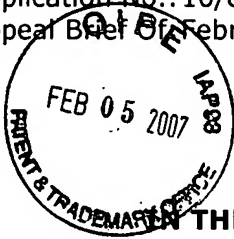
**Fees Paid (\$)**

500.00

<b>SUBMITTED BY</b>		<b>Complete (if applicable)</b>			
Signature		Registration No. Attorney/Agent)	48,54/8	Telephone	610-407-0700
Name (Print/Type)	Lowell L. Carson	Date	February 1, 2007		

This collection of information is required by 37 CFR 1.136. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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**THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Appln. No: 10/805,846  
Appellant: Ming LI  
Filed: March 22, 2004  
Title: METHOD OF CONTROLLING HOLE SHAPE DURING ULTRAFAST  
LASER MACHINING BY MANIPULATING BEAM POLARIZATION  
TC/A.U.: 1725  
Examiner: Samuel M. Heinrich  
Confirmation No.: 3029  
Notice of Appeal Filed: December 1, 2006  
Docket No.: MATG-406US

**APPEAL BRIEF**

Mail Stop Appeal Brief-Patents  
Commissioner for Patents  
P. O. Box 1450  
Alexandria, VA 22313-1450

S I R :

In response to the Official Action dated November 21, 2006, Appellant is submitting this Appeal Brief for the above-identified application.

**I. REAL PARTY IN INTEREST**

The Real Party in Interest in this matter is Matsushita Electric Industrial Co., Ltd.

**II. RELATED APPEALS AND INTERFERENCES**

There are no other appeals or interferences known to Appellant, Appellant's legal representative, or Assignee which may be related to, be directly affected by, or have a bearing on the Board's decision in the pending appeal.

### **III. STATUS OF CLAIMS**

Claims 1-27 are pending in this application. Claims 4-27 have been withdrawn from consideration. Claims 1-3 stand rejected. Claims 1-3 are appealed. Of those claims currently under appeal, claim 1 is independent.

### **IV. STATUS OF AMENDMENTS**

The present application is under final rejection. Appellant elected not to submit a Response After Final under 37 C.F.R. §1.116. Instead, Appellant filed a Notice of Appeal on December 1, 2006. The present application has been rejected two times. Prior to the final rejection, Appellant filed an Amendment during prosecution. The Amendment was entered.

### **V. SUMMARY OF CLAIMED SUBJECT MATTER**

Claims 1-3 are appealed. The claimed invention is directed to a novel method for controlling the shape of the area on a workpiece surface that is laser machined by a pulse of laser light. As background, laser machining uses pulses of laser light to alter a portion of the workpiece. This alteration may involve: the removal of material (ablation); the deposition of material (laser assisted chemical vapor deposition); or changing a property of the material, such as crystalline structure, chemical structure, and/or index of refraction. In order to laser machine an area of a workpiece surface, the fluence of the pulses of laser light must exceed a machining threshold in the area to be machined. If the cross-sectional intensity profile of the laser beam is not constant, as is typically the case, the area machined by a pulse of the laser light may be smaller than the beam spot on the surface. It has been found that the polarization of the laser light may also affect the laser machining process.

**In general terms, Appellant's claimed invention recites**

In accordance with 37 C.F.R. § 41.37(c)(1)(v), a concise explanation of the subject matter defined in independent claim 1, the only independent claim under appeal, is set for the below. Citations to the application's support for claimed subject matter are made by reference to numbered paragraph (¶) of Appellant's specification (AS) as originally filed (e.g., AS ¶ 0006) as well as corresponding figures (Figs.).

*Claim 1*

Independent claim 1 broadly recites a method for controlling the shape of the area on a workpiece surface that is laser machined by a pulse of laser light by controlling both the intensity and the polarization of the laser light. AS ¶ 0015; Fig. 2. The shape of the area on a workpiece surface that is laser machined may be controlled to be a specific predetermined elliptical shape using the recited method. AS ¶ 0049-0052; Fig. 3. The pulse of laser light is generated and focused to form a beam spot on the surface of the workpiece. AS ¶ 0048. The major axis length of the predetermined elliptical shape to be machined is less than or equal to the diameter of the beam spot of the pulse of laser light (AS ¶ 0048), but the major axis may be aligned at any angle (AS ¶ 0050). The ellipticity of the laser machined area and the angle of the major axis of this elliptically shaped area are controlled by controlling the polarization of the pulses of laser light. AS ¶ 0050; Fig. 3.

This is accomplished by adjusting a polarization of the pulse of laser light such that the pulse of laser light is elliptically polarized in the beam spot with an axis of the polarization ellipse oriented in the direction of the major axis of the area to be laser machined on the workpiece surface. The ellipticity of the polarization of the pulse of laser light is adjusted such that the pulse of laser light has contours of constant machining

capacity on the surface of the microstructure workpiece that are substantially similar in shape to the predetermined elliptical shape of the area to be machined. AS ¶ 0050, 0051; Fig. 3. The fluence of the focused pulse of laser light is controlled in the beam spot such that the area of the surface of the workpiece laser machined by the pulse of laser light is substantially the predetermined elliptical shape. AS ¶ 0052; Fig. 3.

## **VI. GROUND OF REJECTION TO BE REVIEWED ON APPEAL**

Claims 1-3 stand rejected under 35 U.S.C. § 102(b) as anticipated by U.S. Patent Pub. No. 2002/0141473 to Cordingley et al. (Cordingley I) or U.S. Patent Pub. No. 2002/0170898 to Ehrmann et al. (Ehrmann et al.). Claims 1-3 also stand rejected under 35 U.S.C. § 102(a) as anticipated by European Pat. Appl. No. 1,338,371 to Fumitsugu et al. (Fumitsugu et al.).

## **VII. ARGUMENT**

### **A. ARGUMENT SUMMARY**

**1. APPELLANT'S INVENTION AS RECITED IN CLAIMS 1-3 IS NOVEL OVER THE DISCLOSURE OF CORDINGLEY I BECAUSE CORDINGLEY I DOES NOT DISCLOSE CONTROLLING THE POLARIZATION AND FLUENCE OF A PULSE OF LASER LIGHT TO CONTROL THE "SHAPE OF AN AREA LASER MACHINED BY [THE] PULSE OF LASER LIGHT ON A SURFACE OF A WORKPIECE TO BE A PREDETERMINED ELLIPTICAL SHAPE."**

The issue on appeal with respect to this rejection of claims 1-3 is whether the disclosure of Cordingley I anticipates every limitation of Appellant's independent claim 1. Claim 1 includes a limitation that recites:

...d) adjusting an ellipticity of the polarization of the pulse of laser light such that the pulse of laser light has contours of constant machining capacity on the surface of the microstructure workpiece, the constant machining capacity contours having a substantially similar shape to the predetermined elliptical shape; and

e) controlling fluence of the focused pulse of laser light in the beam spot such that the area of the surface of the workpiece laser machined by the pulse of laser light is substantially the predetermined elliptical shape. (Emphasis added.)

Appellant argued that this limitation of claim 1 distinguished over the Cordingley I patent in response to the rejection of claims 1-3 in the first, non-final Office Action. The subsequent Final Office Action provided only the following terse response to Appellant's argument:

Applicant argues that Cordingley et al. do not disclose the polarization of the beam to change the shape of the area machined by a pulse. This argument is not convincing. Cordingley et al. describe circularly, linearly or elliptically polarized beams aligned with the link to be machined. Final Office Action, page 3.

This statement fails to illustrate the Examiner's reasoning with respect to how varying the polarization of a laser beam to increase the size of the energy window in which a link may be successfully cut, as Cordingley I discloses, anticipates Appellant's control of the polarization and fluence of a pulse of laser light to laser machine an area of a workpiece surface having a specific predetermined shape. Cordingley I does disclose using different shaped beam spots to cut links with less wasted energy (§ 0052; Fig. 11); however, even this disclosure does not teach using either the polarization or fluence of the pulse of laser light to control the shape of the area being laser machined.

During patent examination, the Patent Office is entitled to construe pending claims under their "broadest reasonable interpretation." *In re Hyatt*, 211 F.3d 1367, 1372, 54 U.S.P.Q.2d 1664, 1667 (Fed. Cir. 2000). But the Patent Office has recognized in policy that this claim construction is constrained by reason. See MPEP § 2111.01 citing *In re Weiss*, 989 F.2d 1202, 26 U.S.P.Q.2d 885 (Fed. Cir. 1993) (unpublished opinion). In

applying this inordinately broad construction, the Examiner effectively reads Appellant's deformation limitation out of claim 1. Excluding Appellant's limitation of "...adjusting... the polarization... [and] controlling fluence... such that the area... laser machined... is substantially the predetermined elliptical shape..." in this fashion and applying an anticipation rejection to the remaining limitations is improper. See *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 2 U.S.P.Q.2d 1051 (Fed. Cir. 1987) ("A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference."); MPEP § 2131.

**2. APPELLANT'S INVENTION AS RECITED IN CLAIMS 1-3 IS NOVEL OVER THE DISCLOSURE OF EHRMANN ET AL. BECAUSE EHRMANN ET AL. DOES NOT DISCLOSE CONTROLLING THE POLARIZATION AND FLUENCE OF A PULSE OF LASER LIGHT TO CONTROL THE "SHAPE OF AN AREA LASER MACHINED BY [THE] PULSE OF LASER LIGHT ON A SURFACE OF A WORKPIECE TO BE A PREDETERMINED ELLIPTICAL SHAPE."**

The issue on appeal with respect to this rejection of claims 1-3 is whether the disclosure of Ehrmann et al. anticipates every limitation of Appellant's independent claim

1. Claim 1 includes a limitation that recites:

...d) adjusting an ellipticity of the polarization of the pulse of laser light such that the pulse of laser light has contours of constant machining capacity on the surface of the microstructure workpiece, the constant machining capacity contours having a substantially similar shape to the predetermined elliptical shape; and

e) controlling fluence of the focused pulse of laser light in the beam spot such that the area of the surface of the workpiece laser machined by the pulse of laser light is substantially the predetermined elliptical shape. (Emphasis added.)

Appellant argued that this limitation of claim 1 distinguished over the Ehrmann et al. patent in response to the rejection of claims 1-3 in the first, non-final Office Action. The



subsequent Final Office Action provided only the following terse response to Appellant's argument:

Applicant argues that Ehrmann et al. do not disclose the polarization of the beam to change the shape of the area machined by a pulse. This argument is not convincing. Ehrmann et al. describe [0139] forming a controlled elliptical spot and describe [0144] selecting the output polarization for the beam. Final Office Action, page 3.

This statement identifies paragraphs in which Ehrmann et al. disclose means of forming non-circular beam spots. Ehrmann et al. disclose that these means may use linearly polarized light to form the non-circular beam spots and that the resulting beam of laser light may have various polarizations; however, the only use suggested for these various polarizations is with reference to US Pat. No. 6,181,728 to Cordingley et al. (Cordingley II). Cordingley II is a parent application of Cordingley I and does not disclose any material regarding polarization not disclosed in Cordingley I. Thus, the statement provided in the Final Office Action fails to illustrate the Examiner's reasoning with respect to how Ehrmann et al. may anticipate Appellant's control of the polarization and fluence of a pulse of laser light to laser machine an area of a workpiece surface having a specific predetermined shape if Cordingley I does not.

**3. APPELLANT'S INVENTION AS RECITED IN CLAIMS 1-3 IS NOVEL OVER THE DISCLOSURE OF FUMITSUGU ET AL. BECAUSE FUMITSUGU ET AL. DOES NOT DISCLOSE CONTROLLING THE POLARIZATION AND FLUENCE OF A PULSE OF LASER LIGHT TO CONTROL THE "SHAPE OF AN AREA LASER MACHINED BY [THE] PULSE OF LASER LIGHT ON A SURFACE OF A WORKPIECE TO BE A PREDETERMINED ELLIPTICAL SHAPE."**

The issue on appeal with respect to this rejection of claims 1-3 is whether the disclosure of Fumitsugu et al. anticipates every limitation of Appellant's independent claim

1. Claim 1 includes a limitation that recites:

...d) adjusting an ellipticity of the polarization of the pulse of laser light such that the pulse of laser light has contours of constant machining capacity on the surface of the microstructure workpiece, the constant machining capacity contours having a substantially similar shape to the predetermined elliptical shape; and

e) controlling fluence of the focused pulse of laser light in the beam spot such that the area of the surface of the workpiece laser machined by the pulse of laser light is substantially the predetermined elliptical shape. (Emphasis added.)

Appellant argued that this limitation of claim 1 distinguished over the Fumitsugu et al. patent in response to the rejection of claims 1-3 in the first, non-final Office Action. The subsequent Final Office Action provided only the following terse response to Appellant's argument:

Applicant argues that that EP1338371A [Fumitsugu et al.] involves focusing the laser beam within the material. This argument is not convincing. EP1338371A describes (Front Page) focusing inside the work and describe the beam is irradiated on the surface of the work, and describe [0218] elliptical polarization. Final Office Action, page 3.

This statement mischaracterizes Applicant's argument with regard to Fumitsugu et al. Fumitsugu et al. disclose a method for cutting materials using lasers. This method involves forming a line of damaged material in the material by focusing the laser beam within the material. The material may then be broken along this line of damage. *Fumitsugu et al.* ¶ 0006. This line of damage includes surface cracking formed by the shock from the pulses, which Fumitsugu et al. disclose to occur preferentially in the direction of polarization of linearly polarized pulses (or the major polarization axis of elliptically polarized pulses). *Fumitsugu et al.* ¶ 0215. Thus, Fumitsugu et al. do not use the polarization of the beam to control the shape of an elliptical area of the surface machined by a laser pulse as recited in claim 1.

**B. ISSUE**

All the appealed claims stand rejected under 35 U.S.C. § 102(b) as anticipated by the disclosures of either Cordingley I or Ehrmann et al. All the appealed claims also stand rejected under 35 U.S.C. § 102(a) as anticipated by the disclosure of Fumitsugu et al. These are the only rejections; there are no other rejections and no other applied references. The issue on appeal is whether the disclosures of Cordingley I, Ehrmann et al., or Fumitsugu et al. anticipate Appellant's claimed invention.

**C. LEGAL STANDARD**

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for patent, or

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of the application for patent in the United States,... 35 U.S.C. § 102 (2007)

To anticipate a claim, the reference must teach every element of the claim. MPEP § 2131 citing *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 2 U.S.P.Q.2d 1051 (Fed. Cir. 1987). Appellant challenges the Office Action's rejections based on Cordingley I, Ehrmann et al., and Fumitsugu et al. because Cordingley I, Ehrmann et al., and Fumitsugu et al. fail to disclose every aspect of the pending claims. That is, each of Appellant's pending claims recites at least one feature that is not taught by Cordingley I, Ehrmann et al., or Fumitsugu et al. Therefore, the Examiner's rejection of Appellant's pending claims under 35 U.S.C. §§ 102(a) and (b) are in error.

**D. APPELLANT'S INVENTION AS RECITED IN CLAIMS 1-3 IS NOVEL OVER THE DISCLOSURE OF CORDINGLEY I BECAUSE CORDINGLEY I DOES NOT DISCLOSE CONTROLLING THE POLARIZATION AND FLUENCE OF A PULSE OF LASER LIGHT**

**TO CONTROL THE "SHAPE OF AN AREA LASER MACHINED BY [THE] PULSE OF LASER LIGHT ON A SURFACE OF A WORKPIECE TO BE A PREDETERMINED ELLIPTICAL SHAPE."**

It is settled law that the Patent Office is charged with construing claims under prosecution to their "broadest reasonable interpretation." *In re Hyatt*, 211 F.3d 1367, 1372, 54 U.S.P.Q.2d 1664, 1667 (Fed. Cir. 2000). This is sound policy based upon recognition of an applicant's ability to amend the claims during prosecution and avoiding the issuance of claims that might be construed, post-issuance, more broadly than is warranted. *In re Prater*, 415, F.2d 1393, 162 U.S.P.Q. 541 (CCPA 1969). However, the courts and the PTO have recognized that there are limits to the "broadest reasonable interpretation." *See, e.g., In re Cortwright*, 165 F.3d 1353, 49 U.S.P.Q.2d (Fed. Cir. 1999); MPEP § 2111.01.

The Examiner's rejection of independent claim 1 based on the disclosure of Cordingley I extends beyond those limits. The Appellant's claim 1 recites:

...d) adjusting an ellipticity of the polarization of the pulse of laser light such that the pulse of laser light has contours of constant machining capacity on the surface of the microstructure workpiece, the constant machining capacity contours having a substantially similar shape to the predetermined elliptical shape; and

e) controlling fluence of the focused pulse of laser light in the beam spot such that the area of the surface of the workpiece laser machined by the pulse of laser light is substantially the predetermined elliptical shape. (Emphasis added.)

Thus, Applicant's invention, as recited in claim 1, controls both the polarization properties and the fluence of pulses of laser light so that each pulse of laser light machines an area of the workpiece surface that substantially matches a predetermined shape, without varying the intensity profile of the beam spot. This feature of Applicant's invention is illustrated in Figure 3.

Cordingley I discloses a method that involves varying the polarization of a laser beam used to cut links on a semiconductor device. However, Cordingley I does not use the polarization of the beam to change the shape of the area machined by a laser pulse as recited in claim 1. Instead, Cordingley I discloses varying the polarization of their laser beam to increase the size of the energy window in which a link may be successfully cut. Additionally, because the method of Cordingley I is a thermal process that uses long pulses, this method does not produce holes that have a well defined shape based only on the laser beam. Instead, Cordingley I disclose that efficient link removal requires cracking of coating layers at the upper corners of the links. *Cordingley I* ¶ 0052, 0062. Thus, the hole shape produced by the method of Cordingley et al. is primarily dependent on the shape the link, not the properties of the beam used to cut the link.

On the other hand, in the present invention, as recited in claim 1, the shape of the feature machined by each laser pulse is controlled by adjusting the polarization properties and the fluence of pulses of laser light. Excluding Appellant's limitation of "...adjusting... the polarization... [and] controlling fluence... such that the area... laser machined... is substantially the predetermined elliptical shape..." in this fashion and applying an anticipation rejection to the remaining limitations is improper. See *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 2 U.S.P.Q.2d 1051 (Fed. Cir. 1987) ("A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference."); MPEP § 2131.

**E. APPELLANT'S INVENTION AS RECITED IN CLAIMS 1-3 IS NOVEL OVER THE DISCLOSURE OF EHRMANN ET AL. BECAUSE EHRMANN ET AL. DOES NOT DISCLOSE CONTROLLING THE POLARIZATION AND FLUENCE OF A PULSE OF LASER LIGHT TO CONTROL THE "SHAPE OF AN AREA LASER MACHINED BY [THE] PULSE OF LASER LIGHT ON A SURFACE OF A WORKPIECE TO BE A PREDETERMINED ELLIPTICAL SHAPE."**

The issue on appeal with respect to this rejection of claims 1-3 is whether the disclosure of Ehrmann et al. anticipates every limitation of Appellant's independent claim

1. Claim 1 includes a limitation that recites:

...d) adjusting an ellipticity of the polarization of the pulse of laser light such that the pulse of laser light has contours of constant machining capacity on the surface of the microstructure workpiece, the constant machining capacity contours having a substantially similar shape to the predetermined elliptical shape; and

e) controlling fluence of the focused pulse of laser light in the beam spot such that the area of the surface of the workpiece laser machined by the pulse of laser light is substantially the predetermined elliptical shape. (Emphasis added.)

Appellant argued that this limitation of claim 1 distinguished over the Ehrmann et al. patent in response to the rejection of claims 1-3 in the first, non-final Office Action because "Ehrmann et al. does not disclose the use of polarization in laser machining." However, as the Examiner noted in the subsequent Final Office Action, "Ehrmann et al. describe [0139] forming a controlled elliptical spot and describe [0144] selecting the output polarization for the beam." Final Office Action, page 3.

Ehrmann et al. disclose means of forming non-circular beam spots using linearly polarized light. *Ehrmann et al.* ¶ 0144. Ehrmann et al. also disclose that the resulting beam of laser light may have various polarizations; however, Ehrmann et al. also incorporates Cordingley II by reference. *Ehrmann et al.* ¶ 0144. This incorporation by

reference provides the only disclosure or suggestion of a use for various polarizations of the beam of laser light. Cordingley II is a parent application of Cordingley I and does not disclose any material regarding polarization that is not also disclosed in Cordingley I. Thus, Ehrmann et al. has at least the same deficiencies as Cordingley I with respect to this limitation of claim 1.

Because Ehrmann et al. does not disclose Appellant's limitation of "...adjusting...  
...the polarization... ...[and] controlling fluence... ...such that the area... ...laser machined...  
...is substantially the predetermined elliptical shape...", Ehrmann et al. cannot serve as the basis for an anticipation rejection of claim 1-3.

**F. APPELLANT'S INVENTION AS RECITED IN CLAIMS 1-3 IS NOVEL OVER THE DISCLOSURE OF FUMITSUGU ET AL. BECAUSE FUMITSUGU ET AL. DOES NOT DISCLOSE CONTROLLING THE POLARIZATION AND FLUENCE OF A PULSE OF LASER LIGHT TO CONTROL THE "SHAPE OF AN AREA LASER MACHINED BY [THE] PULSE OF LASER LIGHT ON A SURFACE OF A WORKPIECE TO BE A PREDETERMINED ELLIPTICAL SHAPE."**

The issue on appeal with respect to this rejection of claims 1-3 is whether the disclosure of Fumitsugu et al. anticipates every limitation of Appellant's independent claim

1. Claim 1 includes a limitation that recites:

...d) adjusting an ellipticity of the polarization of the pulse of laser light such that the pulse of laser light has contours of constant machining capacity on the surface of the microstructure workpiece, the constant machining capacity contours having a substantially similar shape to the predetermined elliptical shape; and

e) controlling fluence of the focused pulse of laser light in the beam spot such that the area of the surface of the workpiece laser machined by the pulse of laser light is substantially the predetermined elliptical shape. (Emphasis added.)

Fumitsugu et al. disclose a method for cutting materials using lasers. This method

involves forming a line of damaged material in the material by focusing the laser beam within the material. The material may then be broken along this line of damage.

*Fumitsugu et al.* ¶ 0006. This line of damage includes surface cracking formed by the shock from the pulses, which Fumitsugu et al. disclose to occur preferentially in the direction of polarization of linearly polarized pulses (or the major polarization axis of elliptically polarized pulses). *Fumitsugu et al.* ¶ 0215. Thus, Fumitsugu et al. do not use the polarization of the beam to control the shape of an elliptical area of the surface machined by a laser pulse as recited in claim 1.

Because Fumitsugu et al. does not disclose Appellant's limitation of "...adjusting...  
...the polarization... ...[and] controlling fluence... ...such that the area... ...laser machined...  
...is substantially the predetermined elliptical shape...", Fumitsugu et al. cannot serve as the basis for an anticipation rejection of claim 1-3.



**G. CONCLUSION**

Appellant has advanced reasons demonstrating that the disclosures of Cordingley I, Ehrmann et al., and Fumitsugu et al. are insufficient as a basis for an anticipation rejection of the pending claims. Accordingly, Appellants respectfully request the Board's reversal of these rejections.

Respectfully submitted,  
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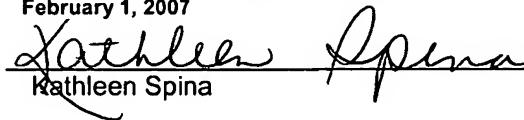
Attachment: Pending Claims

Dated: February 1, 2007

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Kathleen Spina

### **VIII. CLAIMS APPENDIX**

1. A method for controlling a shape of an area laser machined by a pulse of laser light on a surface of a workpiece to be a predetermined elliptical shape with a predetermined major axis aligned in a predetermined direction, the predetermined major axis having a predetermined major axis length less than or equal to a diameter of a beam spot of the pulse of laser light, the method comprising the steps of:

- a) generating the pulse of laser light;
- b) focusing the pulse of laser light to the beam spot within a target area of the microstructure workpiece;
- c) adjusting a polarization of the pulse of laser light such that in the beam spot the pulse of laser light is elliptically polarized and an axis of a polarization ellipse of the pulse of laser light is oriented in the predetermined direction;
- d) adjusting an ellipticity of the polarization of the pulse of laser light such that the pulse of laser light has contours of constant machining capacity on the surface of the microstructure workpiece, the constant machining capacity contours having a substantially similar shape to the predetermined elliptical shape; and
- e) controlling fluence of the focused pulse of laser light in the beam spot such that the area of the surface of the workpiece laser machined by the pulse of laser light is substantially the predetermined elliptical shape.

2. The method according to claim 1, wherein the diameter of the beam spot is substantially diffraction limited.

3. The method according to claim 1, wherein step (c) includes adjusting the polarization of the pulse of laser light such that, in the beam spot, the pulse of laser light is linearly polarized in the predetermined direction.

**RELATED PROCEEDINGS APPENDIX**

None

**EVIDENCE APPENDIX**

None